Automation in Today's Pharmacy

The James

THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

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The Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute

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We are central Ohio's only academic medical center

| 7 hospitals | 1,506 beds | 9 multispecialty centers | NCI designated comprehensive cancer center | 100+ facilities |

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Department of Pharmacy Overview

- ~ 500 FTEs
  - 600 employees
  - 30 Pharmacy Residents
- 12 Pharmacy Licenses
- 23 Pharmacy Locations
  - 2 Specialty/Retail Locations
- 12 million doses dispensed annually
- 340B Covered Entity
- Approaching spend of $450 million annually
- Robust services in patient care, operations, medication safety, informatics, and finance

Technology: Medication Distribution

- **UH/Ross**
  - Hybrid distribution, mostly **decentralized**
  - ~14,000 doses per day
  - ~80% of medications from Pyxis
  - ~20% of medications from Central/cart fill/ IVs
- **James (Inpatient)**
  - Hybrid distribution, mostly **centralized**
  - About 8,000 dispenses per day
  - About 60% of meds from Pyxis
  - About 37% of meds from central automation
  - About 3% of meds picked manually
  - (About 10% of all dispenses are IVs)

Pharmacy Automation:

The development of today's pharmacy automation has allowed pharmacies to become more streamlined and efficient from procurement to dispensing.

In this presentation our goal is to introduce and explain the function and impact of this automation on the pharmacy department as a whole.

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Pharmacy Automation

Please note we are going to discuss various aspects of pharmacy automation and we will refer to the specific products we use; however, there are other products available that may have similar features. We are not specifically endorsing any product or showing any bias, just discussing the products we use as a way to illustrate automation.

Some of the automations to be discussed include Swisslog, ATP, Apoteca, Epic Willow Inventory, and Pyxis.

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Pharmacy Automation & Technology:
Integration from Receiving to Administration

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Virtual Inventory Platform (VIP)

- Virtual Inventory platforms support multi-facility medication inventory management.

- It includes features that support automated balance updates based on dispense and transfers, recording of returns and waste, easy intra-facility stock transfers, automated purchase order generation and replenishment.

- Some also interface to medication wholesalers and pharmacy automation.

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Virtual Inventory Platform

- Full transparency of inventory items across the entire pharmacy system
- Interfaces with wholesale ordering platform and pharmacy automation
- Allows for default NDC selection
- Internal inventory transfers and billing
- Auto order function
- Build, place, receive order capabilities
- Flexibility when changing products

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Virtual Inventory Platform
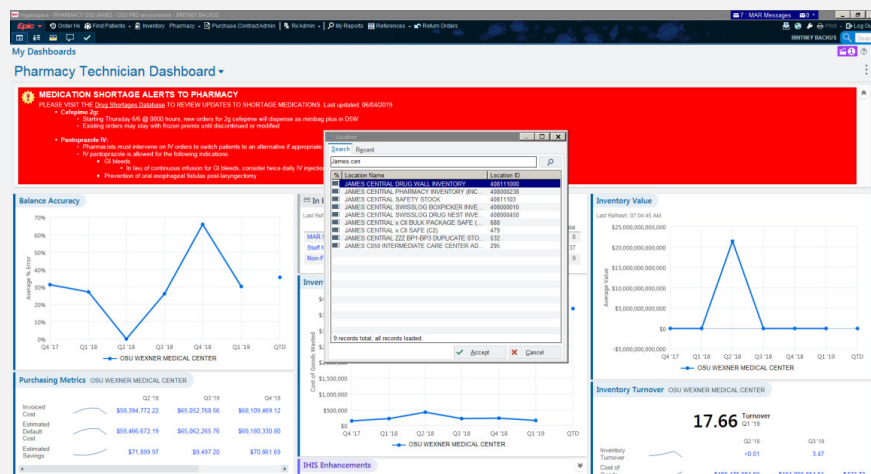
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Virtual Inventory Platform

- Select Inventory to work in
- Detailed line item view
- Create orders
- Transfer product from one inventory location to another for billing
- Cycle count
- View open orders
- View requests to fill for other sites
- Update inventory counts
- Adjust par levels
- Show min/max

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Virtual Inventory Platform

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Transaction history provides a look at product movement

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- Choose sub-location
- Set par levels
- Display by package/mL
- Calculated pars
- Cost

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Virtual Inventory Platform

| Item Balance: ACETAMINOPHEN 160 MG/5ML PO SOLN, 20.3 mL, Cup, JAMES CENTRAL SWISSLOG BOXPICKER INVENTORY (INCLUDES BP-1 and BP-2 ONLY) |

NDC Details

✔ Keep on medication list (F7)   ● Default reorder (F8)   ○ Dispense package (F9)   ✗ Do not reorder

✔ ● ○ ✗	NDC Code	Count	Package Size	Description	Manufacturer	Medication	Use Type	Modifiers
○	0121-0657-21	100	20.3 mL	Cup	PHARMACEUTICAL ASSOCIATES	ACETAMINOPHEN 160 MG/5ML PO SOLN	Unit-Dose	RED, CHERRY, ALCOHOL FREE
✔ ● ○	0121-1971-00	100	20.3 mL	Cup	PHARMACEUTICAL ASSOCIATES	ACETAMINOPHEN 650 MG/20.3ML PO SOLN	Unit-Dose	RED, CHERRY, ALCOHOL FREE
○	0121-1971-21	1	20.3 mL	Cup	PHARMACEUTICAL ASSOCIATES	ACETAMINOPHEN 650 MG/20.3ML PO SOLN	Unit-Dose	RED, CHERRY, ALCOHOL FREE
○	0904-6820-76	100	20.3 mL	Cup	MAJOR PHARMACEUTICALS	ACETAMINOPHEN 650 MG/20.3ML PO SOLN	Unit-Dose	INSTITUTIONAL/HOSP. PACK, CH
○	66689-056-01	1	20.3 mL	Cup	VISTAPHARM INC.	ACETAMINOPHEN 650 MG/20.3ML PO SOLN	Unit-Dose	CHERRY, ALCOHOL FREE
○	66689-056-99	100	20.3 mL	Cup	VISTAPHARM INC.	ACETAMINOPHEN 650 MG/20.3ML PO SOLN	Unit-Dose	CHERRY, ALCOHOL FREE

- Ability to set default NDC

- Shows line item description (manufacturer, unit dose vs. bulk, specific item descriptors such as flavor, color, etc.)

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Virtual Inventory Platform

- Designate whether to dispense by package or mL

- Update current on hands

Medication List Settings

☐ Add medication to linked preference list
☑ Always dispense by package

Default inventory item for dispensing: ACETAMINOPHEN 160 MG/5ML PO SOLN, 10.15 mL, Cup
(Inventory item name)

Override default inventory item for dispensing with this item?   [Override]

↗ Update Balances

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Virtual Inventory Platform

- Generate an order
  - Items below par
  - Items below Critical provides the option to set pars for only must have critical lows, rather than items that have just fallen below par

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Virtual Inventory Platform

- Create order for multiple "contracts"

- Contracts designate where an order is being sent

- Order sent to wholesale online order platform through EDI

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Virtual Inventory Platform

- Visibility of order status, supplier and contract info, request number to receive against

Inventory: JAMES CENTRAL SWISSLOG BOXPICKER INVENTORY (INCLUDES BP-1 and BP-2 ONLY)

+ Create Request + Direct Transfer ⚙ Update Balances ☰ Request Queue ☐ Lot and Expiration Manager ☐ Inventory Item Report 🖶 Print Worksheet ⚙ Adjust Par Levels ⚙ Cycle Count 📋 Open a Request ⚙ Admin ▾

Inventory Items | Outgoing Requests (14) | Requests to Fulfill (4)

Filter by status:

	↑	◇	Request Number	Status	Supplier	Contract	Date Requested	Expected Date	Comments
🗐			2883262	Submitted	CuraScript Specialty Distribution	Curascript - Primary	6/11/2019		
🗐			2883261	Submitted	Cardinal Health - Manual Order	Cardinal MANUAL ORDER - Primary -...	6/11/2019	6/12/2019	
🗐			BP1-2883260	Submitted - Initiated request to supplier	Cardinal Health	Cardinal (main) - Interface - UH/UHE...	6/11/2019		
			BP1-2878611	Submitted - Acknowledgement received	Cardinal Health	Cardinal GPO - Interface - UH/UHE/Ja...	6/10/2019	6/11/2019	
			BP1-2878610	Processing	Cardinal Health	Cardinal (main) - Interface - UH/UHE...	6/10/2019		
			BP1-2871883	Processing	Cardinal Health	Cardinal (main) - Interface - UH/UHE...	6/8/2019		
			2638244	Shipped	UH Main Pharmacy	UH Main - Internal	5/31/2019		

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Drug Order Receiving

- Wholesaler totes are labeled with the request number generated by our Virtual inventory platform
- Order is opened and items are scanned to receive in VIP
- If item is changed/substituted in wholesaler ordering platform the original item NDC ordered will zero out and the replacement will add a line item to the order

Inventory Request: BP1-2871883 (Processing)

General | Shipment 1 (Completed) | Shipment 2 (Completed) | Discrepancies | Acknowledgement Summary

Filter by:
☐ Only show discrepancies   Clear Filter

	Item	NDC	Expected Pkg	Oth	Rec	Inv	Fill Status
1	ACETAMINOPHEN 160 MG/5ML PO SOLN, 20.3 mL, Cup	0121-1971-00	2 x 100 x 20.3		0	0	Closed
2	ALBUTEROL SULFATE HFA 108 (90 BASE) MCG/ACT IN AERS, 8 g, Inhaler	0173-0682-24	5 x 8 g		5	5	Closed
3	ALUM & MAG HYDROXIDE-SIMETH PO SUSP, 30 mL, Cup	0121-1761-30	1 x 100 x 30 m		1	1	Closed
4	AZATHIOPRINE 50 MG PO TABS	51079-620-06	1 x 50 Each		0	0	Closed
5	BUDESONIDE-FORMOTEROL FUMARATE 160-4.5 MCG/ACT IN AERO, 6 g, Inhaler	0186-0370-28	9 x 6 g		9	9	Closed
6	CAMPHOR-MENTHOL 0.5-0.5 % EX LOTN, 222 mL, Bottle	54162-550-07	4 x 222 mL		0	0	Closed
7	CAMPHOR-MENTHOL 0.5-0.5 % EX LOTN, 222 mL, Bottle	0145-0628-05	0 x 222 mL		4	4	Closed
8	CYCLOPENTOLATE HCL 1 % OP SOLN, 15 mL, Bottle	17478-100-12	2 x 15 mL	1	1	1	Closed
9	DEXAMETHASONE SODIUM PHOSPHATE 4 MG/ML IJ SOLN, 1 mL, Vial	67457-423-12	9 x 25 x 1 mL		9	9	Closed
10	DIMETHYL SULFOXIDE SOLN, 100 mL, Bottle	38779-2430-5	2 x 100 mL		2	2	Closed

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Swisslog Automation

Box Picker

Drug Nest

- Eliminate human touch
- More efficient pharmacy work flow
- Minimize medication errors
- Better inventory management
- Cost savings
- Elimination of manual packaging processes
- Visualization into drug movement

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Automated Storage and Dispensing System

- All items must be parametered into the inventory management software
- A pharmacist check must be performed before the drug can be accepted into the automation
- Parameter Order Entry:
  - All drug information
  - Par levels
  - Physical storage information
    - Box vs. Special bay
    - Refrigerated
    - Expiration info

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Pill Pick

- Reordering of drugs is generated based on par levels on drug wall
- Drug nest is replenished from the drug wall
- 575 canisters on drug wall

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Drug Wall

- Drug wall consists of canisters, bulk pill bottles, or packs of vials for the autofile
- Par levels for ordering are set in Willow Inventory
- A 15 day supply is kept on the shelf between the canister and bulk bottles based on a rolling 30 day movement history
- Once a canister is filled a pharmacist check is required before the automation will accept the canister for repackage
- Items for drug nest can be tablets, capsules, vials, ampules, etc.

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Drug Nest Unit Dose Repackaging
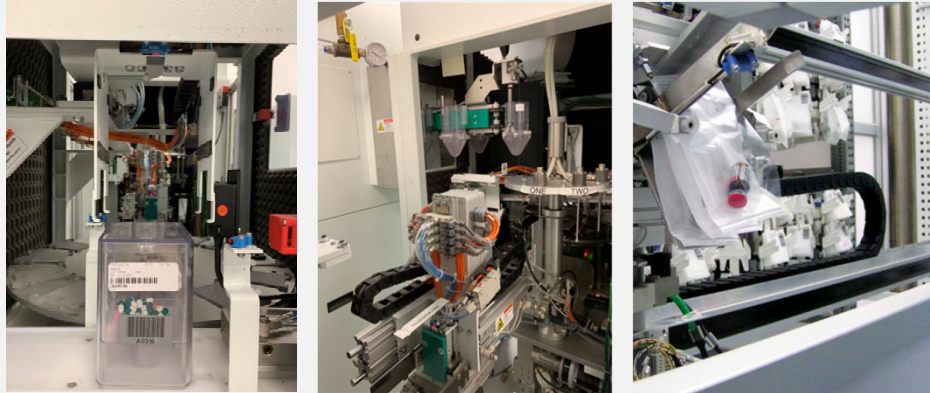
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Drug Nest

- As drugs are packaged from canister into drug nest VIP decrements the quantity from the drug wall inventory and increments the drug nest inventory

- Keep a 4 days min and 6 days max packaged in drug nest based off of a rolling 10 day period of use.

- Drug nest is refilled based off of a below par report generated by the automation

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Drug Nest

- Displays orders ready to dispense
- Cartfill
- Automated dispensing cabinet refill-batch
- ADC stock outs

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Drug Nest

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Automated Pharmacy Storage System

- High density Storage
  - Ambient
  - Refrigerated
  - Dual temperature
- Fully Automated
- Barcode technology
- Multiple work stations
- User safety
- Inventory transparency
- Closed system
- Reporting

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Automated Pharmacy Storage System

- ADC replenishment
- Patient orders
- Screen alerts of orders to fill
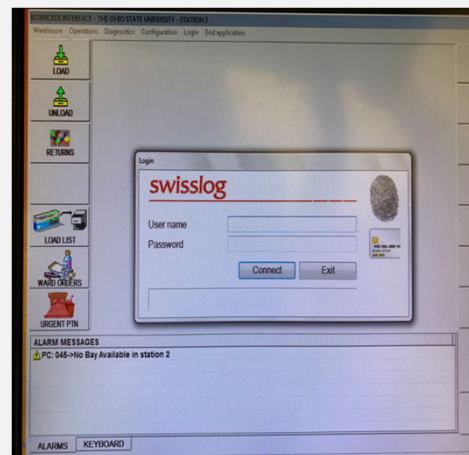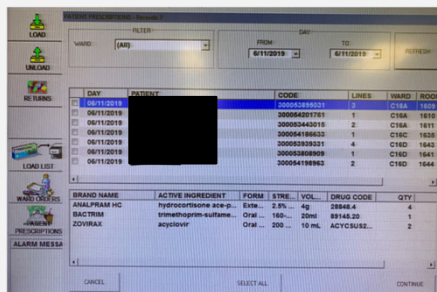
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Automated Pharmacy Storage System
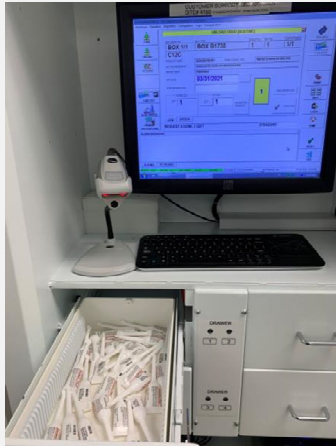
- User station displays dispense information.
  - Location in box
  - Quantity to pick
  - Box number
  - Delivery Location
- Scan drug
- Label is generated

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Automated Pharmacy Storage System

- Multiple user workstations

- Boxes for average sized and average usage items

- Special bay drawers allow for high volume or large storage items

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Automated Pharmacy Storage System

- Fluid inventory location
- Barcode scan technology
- Efficient
- Queue up and go

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Automatic Tablet Packaging Machine (ATP)

- High speed packaging
- Interface with pharmacy automation and software
- Large storage capacity
- Rapid and accurate packaging
- Front end pharmacist verification

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Automatic Tablet Packager

- 360-day expiration dating on repackaged medications
- Software interface
- Ease of use
- Large storage capacity
- Minimal operator oversight
- Replenished through Willow

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ATP Machine

- Specific ADC refills
- Packaged tablets have a detailed lead label
- Safety spacer label prints between each NDC per location

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Automated Dispensing Cabinet

- Automated dispensing cabinet
- Secure medication and dispensing on the nursing units
- Quick access to medications
- Storage of controlled substances and large volume solutions
- Eliminate in pharmacy dispensing for fast moving items
- Comprehensive reporting
- Interface with other pharmacy technologies
- Fast replenishment
- 24 hours of stock

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Automated Chemotherapy Compounding Robot

- Robotic IV preparation device
- Closed system limits exposure to cytotoxic medications
- Increased accuracy of dose preparation via the robot's gravimetric measurement
- Interfaces with VIP
- Visual verification via camera for pharmacist
- Multiple doses back to back without intervention
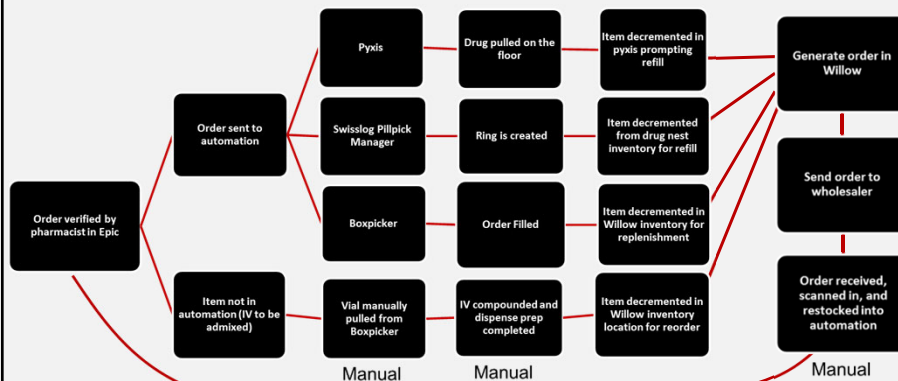- Used for standardized dose compounds

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Thank you

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Creating a Cancer-free World.
One Person, One Discovery at a Time.

The Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute

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